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taking over service to the group of network nodes.

REMARKS

Claims 1-59 are pending in the application. Claims 1, 7, 8, 12, 14, 18, 22, 24, 25, 29, 32, 34, 37, 39, 44, 46, 51, 54, and 58 have been amended. Favorable reconsideration of the application, as amended, is respectfully requested.

I. ALLOWABLE SUBJECT MATTER

Applicants acknowledge with appreciation the indicated allowability of claims 7, 8, 12, 14, 22, 24, 29, 32, 37, 44, 46, and 54 subject to being amended to independent form. These claims have been amended to be in independent form. As such, claims 7, 8, 12, 14, 22, 24, 29, 32, 37, 44, 46, and 54 are now in condition for allowance.

Applicants believe that other pending claims are also in condition for allowance for at least the reasons set forth below.

II. OBJECTIONS TO THE DRAWINGS

The drawings stand objected to because of minor informalities regarding some reference numerals in the drawings and their corresponding descriptions in the specification. The relevant portions of the drawings and/or the specification have been corrected/amended not to present any discrepancies between them. Thus, these corrections and amendments are believed to be sufficient to overcome the objections as explained specifically below.

Regarding Figure 2C, the reference numeral "43" for the MUX in Figure 2C has been corrected to read --44--. Its associated description in the specification, i.e., the paragraph beginning at page 11, line 1, has also been amended accordingly.

Regarding Figure 2E, the reference numeral --89-- for the topology shown in Figure 2E has been added to Figure 2E. As such, the drawings now include the reference numeral 89 mentioned in the specification.

Regarding Figure 3A, a brief description corresponding to the reference numeral 317 has been added to the specification. This description is simply illustrating what the originally filed Figure 3A shows. Thus, no new matter has been introduced by this addition of the description to the specification.

Regarding Figure 9, the reference numeral "1310" in Figure 9 has been corrected to read --910--. Thus, the reference numeral 910 in Figure 9 properly refers to the plurality of wireless transmitting and receiving devices 910 mentioned at page 34, lines 25-26.

As discussed above, basis for all of the corrections of the drawings and the amendments to the specification is found in the originally filed application. Thus, no new matter has been introduced by these amendments. Withdrawal of the objections is respectfully requested.

In addition, the specification has been amended to indicate the application numbers of two related applications in the cross-reference section, and to correctly refer to the title of the related application.

III. REJECTIONS OF CLAIMS 1-6, 9-11, 13, 15-21, 23, 25-28, 30, 31, 33-36, 38-43, 45, 47-53, AND 55-59 UNDER 35 U.S.C. §§ 102 AND 103

Claims 1-6, 9-11, 13, 15-21, 23, 25-28, 30, 31, 33-36, 38-43, 45, 47-53, and 55-59 stand rejected under 35 U.S.C. §§ 102(e) and 103 primarily based on U.S. Patent No. 6,449,250 (“Otani”). U.S. Patent No. 6,236,678 (“Horton”) was cited for remedying the deficiencies of Otani in rejecting claims 20 and 59 under 35 U.S.C. § 103. All pending claims are believed to be allowable for at least the following reasons. Withdrawal of the rejection is respectfully requested.

Independent claims 1, 18, 25, 34, 39, 51, and 58 have been amended to further clarify pertinent features of the invention. Specifically, the invention defined in independent claim 1 now requires a method including “receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered.” All other independent claims (i.e., claims 18, 25, 34, 39, 51, and 58) contain recitations similar to that of claim 1. Support for these amendments is found at, for example, page 17, lines 9-11 of the present specification. Thus, no new matter has been introduced by the amendments.

One goal of the present invention is in providing redundancy for headend components of digital cable networks. Specifically, the redundancy utilizes at least two headend devices, e.g., a working CMTS and a protecting CMTS. When the working CMTS becomes unavailable to service its group of cable modems, the protecting CMTS takes over service to those cable modems. Preferably, the switchover takes place substantially transparently to the cable modems. This transparency to the cable modems can be realized by keeping the working and protecting CMTSs in synchronization regarding service parameters for the cable modems.

Independent claims 1, 18, 25, 34, 39, 51, and 58 require that this synchronization occur “at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered.” As described in detail at page 17, lines 4-17 of the

specification, synchronization may be triggered when (a) local configuration changes are detected or (b) a standby CMTS (in learn state) is just discovered.

By contrast, neither of Otani and Horton disclose the above-identified feature of the invention, i.e., synchronizing the headend device to the protecting headend device “at least when configuration data associated with the working headend device is changed, or a new protecting headend device is discovered.”

The Otani patent describes a conventional switching mechanism for a plurality of central devices. As described at column 7, lines 27-32; column 8, lines 30-34; and column 11, lines 1-7, the Otani devices 10 and 12 transmit routing protocols at regular intervals. In other words, Otani is not concerned with synchronization between devices when configuration data associated with the working headend device is changed, or a new protecting headend device is discovered as recited in independent claims. Nothing in Otani teaches or suggests this specific timing of synchronization of the working headend device to the protecting headend device. Thus, Otani fails to teach or suggest the claimed feature.

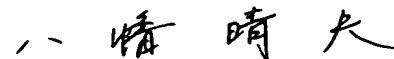
In general, the Horton patent describes a system in which requests to transmit data packets upstream from a cable modem to a cable headend are generating. Horton was cited by the Examiner as presenting a CMTS which is embodied as a line card. Horton is silent on a timing of synchronization between a working CMTS and a protecting CMTS. Accordingly, Horton does not make up the deficiencies of Otani.

For at least the reasons set forth above, the invention defined in independent claims 1, 18, 25, 34, 39, 51, and 58 and their dependent claims is believed to be patentable over the cited art. Withdrawal of the rejections is respectfully requested.

IV. CONCLUSION

Applicants believe that all pending claims are in condition for allowance, and respectfully request a Notice of Allowance at an early date. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 510-843-6200.

Respectfully submitted,
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Limited Recognition under 37 CFR §10.9(b)

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APPENDIX – VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The paragraph beginning at page 1, line 4 has been amended as follows:

This invention is related to the following US Patent Applications: US Patent Application Serial No. [09/____] (attorney docket no. CISCP115/WGM1434) 09/484,189, filed on the same day as this patent application, naming Daruwalla, Forster, Roeck, Woundy, and Thomas as inventors, and titled “ROUTING PROTOCOL BASED REDUNDANCY DESIGN FOR SHARED-ACCESS NETWORKS”; and US Patent Application Serial No. [09/____] (attorney docket no. CISCP122/WGM1242) 09/484,611, filed on the same day as this patent application, naming Daruwalla, Forster, Roeck, Chapman, Zang, and Lu as inventors, and titled “[ROUTING PROTOCOL BASED REDUNDANCY DESIGN FOR SHARED-ACCESS NETWORKS] METHOD FOR A CABLE MODEM TO RAPIDLY SWITCH TO A BACKUP CMTS

The paragraph beginning at page 11, line 1 has been amended as follows:

In this example, working CMTS 39 provides downstream signals on a first downstream channel and working CMTS 41 provides downstream signals on a second, different, downstream channel. Preferably, protecting CMTS 37 provides service on the same downstream channel as the working CMTS for which it is taking over. Thus, in most embodiments, protecting CMTS 37 can service only one of working CMTS 39 and working CMTS 41 at any given time. In the depicted embodiment, 2-to-1 multiplexers [43] 44 and 45 reside on the downstream intermediate frequency paths of working CMTS 39 and working CMTS 41, respectively. These multiplexers also receive signals from a downstream port of protecting CMTS 37 when it is acting on behalf of one of the working CMTSs. Note that downstream signals from protecting CMTS 37 pass through a splitter/combiner 47 that routes the signal to both multiplexer [43] 44 or multiplexer 45, as appropriate. Downstream signals from multiplexers [43] 44 and 45 are upconverted to radio frequency signals of appropriate frequency by upconverters 49 and 51, respectively.

The paragraph beginning at page 15, line 12 has been amended as follows:

Another field of the packet header 301 is a 1 byte “src_id” 309 that provides a membership identifier of the sender. Valid numbers for working CMTSs are 1-255. 0 is reserved for protecting CMTS in a group. A 1 byte “dest_id” 311 provides a membership identifier of the receiver. Valid numbers for the working CMTSs are 1-255. 0 is reserved for protecting CMTS [CMTS] in a group. Next, header 301 includes a 2 byte “tran_id” field 313 that is used to track message order. A 2 byte “length” field 315 specifies the total length of a CCP message,

excluding its header. A 2 byte "reserved" field 317 specifies a data field which is reserved. Authentication data 319 contain encrypted authentication data (e.g., MD5 or SHA encrypted data) in a 16 byte field for example. In a specific embodiment, if the MSB of version field 303 is 0, authentication is disabled and these 16 bytes are not shown in message.

IN THE CLAIMS:

Claims 1, 7, 8, 12, 14, 18, 22, 24, 25, 29, 32, 34, 37, 39, 44, 46, 51, 54, and 58 have been amended as follows:

1. (Amended) A method of providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems.

7. (Amended) [The] A method of [claim 1] providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein receiving information about the status of the group of cable modems comprises receiving a portion of synchronization data for the group of cable modems, and wherein the portion of synchronization data comprises data that has changed since a previous synchronization.

8. (Amended) [The] A method of [claim 1] providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein the protecting CMTS provides downstream messages to the group of cable modems on the same downstream channel as used by the working CMTS to provide service to the group of cable modems.

12. (Amended) [The] A method of [claim 11] providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a designated node on the cable network, and [,]

wherein determining that the working CMTS is not responding comprises receiving no acknowledgement of a HELLO message within a predefined time after the HELLO message was sent from the protecting CMTS to the working CMTS.

14. (Amended) [The] A method of [claim 13] providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received, and [,]

wherein the network node is a cable modem or an upconverter.

18. (Amended) CMTS apparatus capable of acting as a protecting CMTS on a cable network having a group of cable modems to be serviced by a working CMTS, such that when the working CMTS becomes unavailable, the protecting CMTS can take over service to the group of modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to receive and store synchronization data from the working CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered, the synchronization data specifying information about the group of cable modems.

22. (Amended) [The] CMTS apparatus [of claim 18] capable of acting as a protecting CMTS on a cable network having a group of cable modems to be serviced by a working CMTS, such that when the working CMTS becomes unavailable, the protecting CMTS can take over service to the group of modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to receive and store synchronization data from the working CMTS, the synchronization data specifying information about the group of cable modems, and [,]

wherein at least one of the processors and the memory are configured or designed to periodically send HELLO messages to the working CMTS to confirm that the working CMTS is operating.

24. (Amended) [The] CMTS apparatus [of claim 18] capable of acting as a protecting CMTS on a cable network having a group of cable modems to be serviced by a working CMTS, such that when the working CMTS becomes unavailable, the protecting CMTS can take over service to the group of modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to receive and store synchronization data from the working CMTS, the synchronization data specifying information about the group of cable modems, and [,]

wherein at least one of the processors and the memory are configured or designed to service the group of cable modems using a downstream frequency that is identical to a downstream frequency used by the working CMTS.

25. (Amended) A computer program product comprising a machine readable medium on which is provided instructions for providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems.

29. (Amended) [The] A computer program product [of claim 25] comprising a machine readable medium on which is provided instructions for providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein the instructions provide that the protecting CMTS provides downstream messages to the group of cable modems on the same downstream channel as used by the working CMTS to provide service to the group of cable modems.

32. (Amended) [The] A computer program product [of claim 31] comprising a machine readable medium on which is provided instructions for providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein the instructions for determining that the protecting CMTS is to take over service to the group of cable modems comprises instructions for determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a network node on the cable network, and[,]

wherein the network node is a cable modem or an upconverter.

34. (Amended) CMTS apparatus capable of acting as a working CMTS on a cable network having a group of cable modems to be serviced by the working CMTS, such that when the working CMTS becomes unavailable, a protecting CMTS can take over service to the group of cable modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to send synchronization data to the protecting CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered, the synchronization data specifying information about the group of cable modems.

37. (Amended) [The] CMTS apparatus [of claim 34] capable of acting as a working CMTS on a cable network having a group of cable modems to be serviced by the working CMTS, such that when the working CMTS becomes unavailable, a protecting CMTS can take over service to the group of cable modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to send synchronization data to the protecting CMTS, the synchronization data specifying information about the group of cable modems, and[,]

wherein at least one of the processors and the memory are configured or designed to send HELLO acknowledge messages to the protecting CMTS upon receipt of a HELLO message from the protecting CMTS.

39. (Amended) A method of providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

sending synchronization data about the group of modems to the protecting CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems; and

discontinuing service to the group of cable modems.

44. (Amended) [The] A method of [claim 39] providing working service to a group of cable modems on a cable network having a working CMTS providing service to the

group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

sending synchronization data about the group of modems to the protecting CMTS;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems;

discontinuing service to the group of cable modems; and [, further comprising]

determining that a parameter pertaining to at least one of the cable modems in the group of cable modems has changed, and wherein sending the synchronization data comprises sending information pertaining to the changed parameter to the protecting CMTS in order to allow the protecting CMTS to provide service to the group of cable modems.

46. (Amended) [The] A method of [claim 45] providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

sending synchronization data about the group of modems to the protecting CMTS;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems; and

discontinuing service to the group of cable modems,

wherein determining that the protecting CMTS should take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received, and [,]

wherein the network node is a cable modem or an upconverter.

51. (Amended) A computer program product comprising a machine readable medium on which is provided instructions for providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable

modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

sending synchronization data about the group of modems to the protecting CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems; and

discontinuing service to the group of cable modems.

54. (Amended) [The] A computer program product [of claim 51] comprising a machine readable medium on which is provided instructions for providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

sending synchronization data about the group of modems to the protecting CMTS;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems;

discontinuing service to the group of cable modems; and [, further comprising]

instructions for determining that a parameter pertaining to at least one of the cable modems in the group of cable modems has changed, and wherein the instructions for sending the synchronization data comprises instructions for sending information pertaining to the changed parameter to the protecting CMTS in order to allow the protecting CMTS to provide service to the group of cable modems.

58. (Amended) A method of providing backup service to a group of network nodes on a network having a working headend device providing service to the group of network nodes and having a protecting headend device available to take over service to the group of network nodes, the method comprising:

receiving information about the status of the group of network nodes from the working headend device to thereby synchronize the protecting headend device to the working headend device at least when configuration data associated with the working headend device is changed, or a new protecting headend device is discovered;

determining that the protecting headend device is to take over service to the group of network nodes; and

taking over service to the group of network nodes.

APPENDIX – CLEAN VERSION OF PENDING CLAIMS

1. (Amended) A method of providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems.

2. The method of claim 1, wherein receiving information involves receiving a synchronization message from the working CMTS.

3. The method of claim 2, wherein the synchronization message includes MAC and IP addresses of the cable modems in the group of cable modems.

4. The method of claim 2, wherein the synchronization message includes DOCSIS parameters for the cable modems of the group of cable modems.

5. The method of claim 1, further comprising updating a database of the protecting CMTS with the received information.

6. The method of claim 1, further comprising: prior to receiving information about the status of the group of cable modems, becoming available to take over service from the working CMTS, wherein the information about the status of the group of cable modems includes an entire set of synchronization data for the group of cable modems from the working CMTS.

7. (Amended) A method of providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein receiving information about the status of the group of cable modems comprises receiving a portion of synchronization data for the group of cable modems, and wherein the portion of synchronization data comprises data that has changed since a previous synchronization.

8. (Amended) A method of providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein the protecting CMTS provides downstream messages to the group of cable modems on the same downstream channel as used by the working CMTS to provide service to the group of cable modems.

9. The method of claim 1, further comprising providing service to a second group of cable modems from the protecting CMTS.

10. The method of claim 1, wherein the protecting CMTS does not provide service to a second group of cable modems.

11. The method of claim 1, wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a designated node on the cable network.

12. (Amended) A method of providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a designated node on the cable network, and

wherein determining that the working CMTS is not responding comprises receiving no acknowledgement of a HELLO message within a predefined time after the HELLO message was sent from the protecting CMTS to the working CMTS.

13. The method of claim 1, wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received.

14. (Amended) A method of providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein determining that the protecting CMTS is to take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received, and

wherein the network node is a cable modem or an upconverter.

15. The method of claim 1, wherein the working CMTS and protecting CMTS are separate CMTS interfaces provided on at least one CMTS chassis.

16. The method of claim 1, wherein service to the group of cable modems is switched from the working CMTS to the protecting CMTS without requiring that the group of cable modems to change their settings.

17. The method of claim 1, further comprising sending synchronization information, regarding the group of cable modems, to the working CMTS after the protecting CMTS takes over service to the group of cable modems.

18. (Amended) CMTS apparatus capable of acting as a protecting CMTS on a cable network having a group of cable modems to be serviced by a working CMTS, such that when the working CMTS becomes unavailable, the protecting CMTS can take over service to the group of modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to receive and store synchronization data from the working CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered, the synchronization data specifying information about the group of cable modems.

19. The CMTS apparatus of claim 18, wherein the CMTS apparatus is a complete CMTS or a portion of a CMTS.

20. The CMTS apparatus of claim 19, wherein the CMTS apparatus is a line card.

21. The CMTS apparatus of claim 18, wherein at least one of the processors and the memory are configured or designed to receive the synchronization data in the form of a synchronization message specifying at least one of addresses and operating statuses of one or more of the cable modems in the group of cable modems.

22. (Amended) CMTS apparatus capable of acting as a protecting CMTS on a cable network having a group of cable modems to be serviced by a working CMTS, such that when the working CMTS becomes unavailable, the protecting CMTS can take over service to the group of modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to receive and store synchronization data from the working CMTS, the synchronization data specifying information about the group of cable modems, and

wherein at least one of the processors and the memory are configured or designed to periodically send HELLO messages to the working CMTS to confirm that the working CMTS is operating.

23. The CMTS apparatus of claim 18, wherein at least one of the processors and the memory are configured or designed to take over responsibility for service to the group of cable modems upon determining that the working CMTS is or will become unavailable to service the group of cable modems.

24. (Amended) CMTS apparatus capable of acting as a protecting CMTS on a cable network having a group of cable modems to be serviced by a working CMTS, such that when the working CMTS becomes unavailable, the protecting CMTS can take over service to the group of modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to receive and store synchronization data from the working CMTS, the synchronization data specifying information about the group of cable modems, and

wherein at least one of the processors and the memory are configured or designed to service the group of cable modems using a downstream frequency that is identical to a downstream frequency used by the working CMTS.

25. (Amended) A computer program product comprising a machine readable medium on which is provided instructions for providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems.

26. The computer program product of claim 25, wherein the instruction for receiving information involves receiving a synchronization message from the working CMTS.

27. The computer program product of claim 25, further comprising instructions for updating a database of the protecting CMTS with the received information.

28. The computer program product of claim 25, further comprising the following instructions: prior to receiving information about the status of the group of cable modems, becoming available to take over service from the working CMTS, wherein the information about the status of the group of cable modems includes an entire set of synchronization data for the group of cable modems from the working CMTS.

29. (Amended) A computer program product comprising a machine readable medium on which is provided instructions for providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein the instructions provide that the protecting CMTS provides downstream messages to the group of cable modems on the same downstream channel as used by the working CMTS to provide service to the group of cable modems.

30. The computer program product of claim 25, further comprising instructions for providing service to a second group of cable modems from the protecting CMTS.

31. The computer program product of claim 25, wherein the instructions for determining that the protecting CMTS is to take over service to the group of cable modems comprises instructions for determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a network node on the cable network.

32. (Amended) A computer program product comprising a machine readable medium on which is provided instructions for providing backup service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

receiving information about the status of the group of cable modems from the working CMTS to thereby synchronize the protecting CMTS to the working CMTS;

determining that the protecting CMTS is to take over service to the group of cable modems; and

taking over service to the group of cable modems,

wherein the instructions for determining that the protecting CMTS is to take over service to the group of cable modems comprises instructions for determining that the working CMTS is not responding to the protecting CMTS or is not providing signals to a network node on the cable network, and

wherein the network node is a cable modem or an upconverter.

33. The computer program product of claim 1, further comprising instructions for sending synchronization information, regarding the group of cable modems, to the working CMTS after the protecting CMTS takes over service to the group of cable modems.

34. (Amended) CMTS apparatus capable of acting as a working CMTS on a cable network having a group of cable modems to be serviced by the working CMTS, such that when the working CMTS becomes unavailable, a protecting CMTS can take over service to the group of cable modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to send synchronization data to the protecting CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered, the synchronization data specifying information about the group of cable modems.

35. The CMTS apparatus of claim 34, wherein the CMTS apparatus is a complete CMTS or a portion of a CMTS.

36. The CMTS apparatus of claim 34, wherein at least one of the processors and the memory are configured to send the synchronization data in the form of a synchronization message specifying at least one of addresses and operating statuses of one or more of the cable modems in the group of cable modems.

37. (Amended) CMTS apparatus capable of acting as a working CMTS on a cable network having a group of cable modems to be serviced by the working CMTS, such that when the working CMTS becomes unavailable, a protecting CMTS can take over service to the group of cable modems, the CMTS apparatus comprising:

one or more processors; and

a memory,

wherein at least one of the processors and the memory are configured or designed to send synchronization data to the protecting CMTS, the synchronization data specifying information about the group of cable modems, and

wherein at least one of the processors and the memory are configured or designed to send HELLO acknowledge messages to the protecting CMTS upon receipt of a HELLO message from the protecting CMTS.

38. The CMTS apparatus of claim 34, wherein at least one of the processors and the memory are configured or designed to send a SWITCH_REQ message indicating that the working CMTS wishes to have the protecting CMTS take over service to the group of cable modems.

39. (Amended) A method of providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

sending synchronization data about the group of modems to the protecting CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems; and

discontinuing service to the group of cable modems.

40. The method of claim 39, wherein sending the synchronization data comprises sending a synchronization message containing the synchronization data.

41. The method of claim 40, wherein the synchronization message includes MAC and IP addresses of the cable modems in the group of cable modems.

42. The method of claim 40, wherein the synchronization message includes DOCSIS parameters for the cable modems of the group of cable modems.

43. The method of claim 39, further comprising determining that the protecting CMTS has become available to provide service to the group of cable modems, and wherein sending the synchronization data comprises sending information pertaining to all current parameters of the group of cable modems in order to allow the protecting CMTS to provide service to the group of cable modems.

44. (Amended) A method of providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

sending synchronization data about the group of modems to the protecting CMTS;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems;

discontinuing service to the group of cable modems; and

determining that a parameter pertaining to at least one of the cable modems in the group of cable modems has changed, and wherein sending the synchronization data comprises sending information pertaining to the changed parameter to the protecting CMTS in order to allow the protecting CMTS to provide service to the group of cable modems.

45. The method of claim 39, wherein determining that the protecting CMTS should take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received.

46. (Amended) A method of providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the method comprising:

sending synchronization data about the group of modems to the protecting CMTS;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems; and

discontinuing service to the group of cable modems,

wherein determining that the protecting CMTS should take over service to the group of cable modems comprises receiving notification from a network node that a downstream signal from the working CMTS is no longer being received, and

wherein the network node is a cable modem or an upconverter.

47. The method of claim 39, wherein notifying the protecting CMTS comprises sending a switch request message to the protecting CMTS.

48. The method of claim 39, wherein the working CMTS and protecting CMTS are separate CMTS interfaces provided on at least one CMTS chassis.

49. The method of claim 39, wherein service to the group of cable modems is switched from the working CMTS to the protecting CMTS without requiring that the group of cable modems to change their settings.

50. The method of claim 39, further comprising receiving synchronization information, regarding the group of cable modems, from the protecting CMTS after discontinuing service to the group of cable modems.

51. (Amended) A computer program product comprising a machine readable medium on which is provided instructions for providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

sending synchronization data about the group of modems to the protecting CMTS at least when configuration data associated with the working CMTS is changed, or a new protecting CMTS is discovered;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems; and

discontinuing service to the group of cable modems.

52. The computer program product of claim 51, wherein the instructions for sending the synchronization data comprises sending a synchronization message containing the synchronization data.

53. The computer program product of claim 51, further comprising instructions for determining that the protecting CMTS has become available to provide service to the group of cable modems, and wherein the instructions for sending the synchronization data comprises instructions for sending information pertaining to all current parameters of the group of cable modems in order to allow the protecting CMTS to provide service to the group of cable modems.

54. (Amended) A computer program product comprising a machine readable medium on which is provided instructions for providing working service to a group of cable modems on a cable network having a working CMTS providing service to the group of cable modems and having a protecting CMTS available to take over service to the group of cable modems, the instructions comprising:

sending synchronization data about the group of modems to the protecting CMTS;

determining that the protecting CMTS should take over service to the group of cable modems;

notifying the protecting CMTS that it should take over service to the group of cable modems;

discontinuing service to the group of cable modems; and

instructions for determining that a parameter pertaining to at least one of the cable modems in the group of cable modems has changed, and wherein the instructions for sending the synchronization data comprises instructions for sending information pertaining to the changed

parameter to the protecting CMTS in order to allow the protecting CMTS to provide service to the group of cable modems.

55. The computer program product of claim 51, wherein the instructions for determining that the protecting CMTS should take over service to the group of cable modems comprises instructions for receiving notification from a network node that a downstream signal from the working CMTS is no longer being received.

56. The computer program product of claim 51, wherein instructions for notifying the protecting CMTS comprises instructions for sending a switch request message to the protecting CMTS.

57. The computer program product of claim 51, further comprising instructions for receiving synchronization information, regarding the group of cable modems, from the protecting CMTS after discontinuing service to the group of cable modems.

58. (Amended) A method of providing backup service to a group of network nodes on a network having a working headend device providing service to the group of network nodes and having a protecting headend device available to take over service to the group of network nodes, the method comprising:

receiving information about the status of the group of network nodes from the working headend device to thereby synchronize the protecting headend device to the working headend device at least when configuration data associated with the working headend device is changed, or a new protecting headend device is discovered;

determining that the protecting headend device is to take over service to the group of network nodes; and

taking over service to the group of network nodes.

59. The method of claim 58, wherein the network is a wireless network.

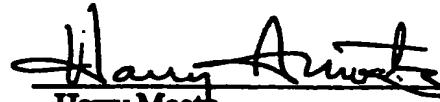
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Expires: November 6, 2003


Harry Moatz
Harry Moatz,
Director of Enrollment and Discipline